

CLAIMS

- 1) A catalytic composition comprising a zeolite and an inorganic binder, wherein the zeolite has a crystalline structure with openings consisting of 12 tetrahedra, and  
5 the binder is  $\gamma$ -alumina, said composition being characterized by a pore volume, obtained by adding the mesoporosity and macroporosity fractions present in the catalytic composition itself, greater than or equal to 0.7 cc/g, wherein at least 30% of said volume consists of pores with a diameter greater than 100 nanometers.  
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- 2) The catalytic composition according to claim 1, having a crushing strength equal to or higher than 1.7 kg/mm.
- 3) The catalytic composition according to claim 1, having an apparent density not higher than 0.5 cc/g.
- 15 4) The catalytic composition according to claim 1, in the form of particles having a diameter not lower than 1.8 mm.
- 5) The catalytic composition according to claim 4, in the form of particles having a diameter not lower than 2.0 mm.
- 6) The catalytic composition according to claim 1, in the  
20 form of cylindrical pellets.
- 7) The catalytic composition according to claim 1, wherein the zeolite is selected from zeolite Y, beta zeolite and ZSM-12.
- 8) The catalytic composition according to claim 1,  
25 wherein the zeolite is in acidic form.

- 9) The catalytic composition according to claim 1,  
wherein the zeolite and the binder are in a weight ratio  
greater than 1:1 and lower than or equal to 4:1.
- 10) The catalytic composition according to one or more of  
5 the previous claims, wherein the zeolite is zeolite Y.
- 11) The catalytic composition according to claim 10,  
wherein the zeolite Y has a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio ranging  
from 10 to 20.
- 12) The catalytic composition according to claim 11,  
10 wherein the zeolite Y has a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio ranging  
from 11 to 17.
- 13) The catalytic composition according to claim 10, 11 or  
12, wherein the zeolite Y is in acidic form.
- 14) A process for preparing the catalytic compositions ac-  
15 cording to one or more of claims 1 to 13, which comprises:
- a) preparing a mixture including a zeolite in acidic form  
and a precursor of the binder selected from bohemite  
and pseudo-bohemite, by means of mechanic mixing of the  
components, using a high speed mixer, at a revolution  
20 speed of between 900 and 1100 rpm, for not less than 50  
minutes;
- b) slowly adding to said mixture, under stirring, a solu-  
tion at a concentration not higher than 0.5% by weight  
of an acid and demineralized water, in such a quantity  
25 as to have a final ratio between the acid weight and

- total weight of the mixture prepared in step a) of between 0.25 and 0.50%;
- c) submitting the mixture obtained in the previous step b) to an extrusion forming process;
  - 5 d) submitting the product obtained in step c) to drying in a ventilated oven, at a temperature not higher than 30°C, for not less than 48 hours;
  - e) submitting the product obtained in step d) to an air calcination process starting from room temperature up 10 to temperatures not lower than 550°C and not higher than 600°C for an overall calcination time of not less than 30 hours.
- 15) The process according to claim 14, wherein, in step (b), the mixing to which the mixture is subjected during 15 the addition of the acid, is effected at a rate ranging from 200 to 600 rpm.
- 16) The process according to claim 14, wherein, in step (b), the acid is selected from acetic acid, nitric acid and oxalic acid.
- 20 17) The process according to claim 16, wherein the acid is acetic acid.
- 18) A process for the transalkylation of aromatic hydrocarbons which comprises putting an aromatic hydrocarbon in contact with one or more polyalkylated aromatic hydrocarbons 25 in the presence of a catalytic composition according

to one or more of claims 1 to 13, operating so that the reaction takes place at least partially in liquid phase.

19) The process according to claim 18, wherein the catalytic composition contains zeolite Y in acidic form.

5 20) The process according to claim 19, wherein the zeolite Y has a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio ranging from 10 to 20.

21) The process according to claim 18, 19 or 20 carried out at a temperature ranging from 150 to 300°C, a pressure ranging from 20 to 50 atms and a WHSV ranging from 0.5 to  
10 10 hours<sup>-1</sup>.

22) The process according to claim 18, 19 or 20, wherein the molar ratio between the aromatic hydrocarbon and the sum of the polyalkylated aromatic hydrocarbons varies from 1 to 40.

15 23) The process according to claim 22, wherein the molar ratio between the aromatic hydrocarbon and polyalkylated aromatic hydrocarbons varies from 3 to 30.

24) The process according to claim 18, 19 or 20, wherein the aromatic hydrocarbon is benzene.

20 25) The process according to claim 18, 19 or 20, wherein the polyalkylated aromatic hydrocarbon is diethyl benzene, optionally mixed with triethyl benzene, or di-isopropyl benzene, optionally mixed with tri-isopropyl benzene.

26) The process according to claims 24 and 25, wherein the  
25 aromatic hydrocarbon is benzene and the polyalkylated aro-

matic hydrocarbon is diethyl benzene and optionally triethyl benzene.

27) A process for preparing mono-alkylated aromatic hydrocarbons which comprises:

- 5    a) putting an aromatic hydrocarbon in contact, in the presence of an acidic catalyst, with a C<sub>2</sub>-C<sub>4</sub> olefin, under alkylation conditions which are such that the reaction takes place at least partially in liquid phase,
- 10   b) separating the product obtained into a fraction containing an aromatic hydrocarbon, a fraction containing a mono-alkylated aromatic hydrocarbon, a fraction containing polyalkylated aromatic hydrocarbons, and a fraction of heavy aromatic hydrocarbons,
- 15   c) putting the fraction containing polyalkylated aromatic hydrocarbons in contact with an aromatic hydrocarbon, in the presence of the catalyst according to one or more of claims 1 to 13, under transalkylation conditions which are such that the reaction takes place at least partially in liquid phase.
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- 28) The process according to claim 27, wherein in step (c) the catalytic composition contains zeolite Y in acidic form.
- 29) The process according to claim 28, wherein the zeolite Y has a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio ranging from 10 to 20.

- 30) The process according to claim 27, 28 or 29, wherein in step (a) the acidic catalyst is a catalytic composition containing a zeolite.
- 31) The process according to claim 30, wherein the zeolite  
5 is beta zeolite.
- 32) The process according to claim 27, 28 or 29, wherein in step (a) the olefin is ethylene or propylene.
- 33) The process according to claim 32, wherein the olefin is ethylene.
- 10 34) The process according to claim 27, 28 or 29, wherein in step (a) the aromatic hydrocarbon is benzene.
- 35) The process according to claim 27, 28 or 29, wherein in step (a) the catalyst contains beta zeolite, the olefin is ethylene and the aromatic hydrocarbon is benzene.
- 15 36) The process according to claim 27, 28 or 29, wherein in step (b) the fraction of polyalkylated aromatic hydrocarbons prevalently contains dialkylated aromatic hydrocarbons.
- 37) The process according to claim 27, 28 or 29, wherein  
20 in step (a) the hydrocarbon is benzene and the olefin is ethylene, in step (b) the first fraction contains benzene, the second fraction contains ethyl benzene, the third fraction prevalently contains diethyl benzene and the last fraction consists of a mixture of heavy hydrocarbons having  
25 a boiling point equal to or higher than 260°C, and in step

(c) the third fraction is put in contact with benzene.

38) The process according to claim 37, wherein the acidic catalyst in step (a) is beta zeolite.

39) The process according to claim 27, 28, 29 or 37,  
5 wherein the fraction of polyalkylated products fed to step  
(c) contains a mixture of Flux oil.

40) The process according to claim 27, 28, 29 or 37,  
wherein the fraction of polyalkylated products fed to step  
(c) contains butyl benzenes in a quantity not higher than  
10 2% by weight with respect to the total weight of the mix-  
ture fed.

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